

CLAIMS

What is claimed is:

- 5 1. A method for constructing an enclosed microchannel structure comprising at least one microchannel of capillary dimension, the method comprising:

providing a first generally planar base substrate fabricated of a plastic material and having at least one generally planar surface, said substantially planar plastic material having formed therein at least one microchannel of capillary dimension at said generally planar surface;

- 10 providing a second generally planar cover substrate having at least one generally planar surface;

apposing said planar surface of said cover substrate and said planar surface of said base substrate; and

- 15 causing formation of a stable interface between said apposed planar surfaces.

- 20 2. The method of claim 1 wherein said planar surface of said cover substrate is fabricated of a plastic material, and wherein said step of causing formation of a stable interface comprises pressing said apposed surfaces together and heating said substrates for a time and to a temperature sufficient to bond said surfaces together.

- 25 3. The method of claim 1, further comprising a step prior to said apposing step, of applying a bonding material to said planar surface of said cover substrate.

4. The method of claim 3 wherein said bonding material comprises an elastomeric adhesive material.

- 30 5. The method of claim 3 wherein said bonding material comprises a thermo-melting bonding material, and wherein said step of causing formation of a stable interface comprises heating said bonding material to a temperature and for a time sufficient to melt said bonding material, and then cooling said bonding material between said apposed surfaces to permit the bonding material to harden.

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6. The method of claim 3 wherein said bonding material comprises an activatable bonding material.
- 5 7. The method of claim 3 wherein said bonding material comprises a curable bonding material.
8. The method of claim 3 wherein said bonding material comprises a polymerizable bonding material.
- 10 9. The method of claim 7 wherein said curable bonding material is applied to said surface in a flowable state, and wherein said method further comprises the step, following the step of applying said bonding material to said planar surface of said cover substrate and prior to the step of apposing the surfaces, of partially curing said curable bonding material to a non-flowable state.
- 15 10. The method of claim 8 wherein said bonding material further comprises a polymerization initiator.
- 20 11. The method of claim 10 wherein said polymerization initiator comprises a photoinitiator, and wherein said step of causing formation of a stable interface comprises exposing said bonding material between said apposed surfaces to light at a wavelength and intensity and for a time sufficient to cause polymerization.
- 25 12. The method of claim 10 wherein said polymerization initiator comprises a thermal initiator, and wherein said step of causing formation of a stable interface comprises heating said bonding material between said apposed surfaces to a temperature and for a time sufficient to cause polymerization.
- 30 13. The method of claim 1 wherein said cover substrate comprises an elastomeric material.

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